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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/592,959	09/15/2006	Hideharu Takezawa	043888-0513	7421

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EXAMINER	
BUCHANAN, JACOB	

ART UNIT	PAPER NUMBER
1725	

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04/26/2011	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/592,959	TAKEZAWA, HIDEHARU	
	Examiner	Art Unit	
	Jacob Buchanan	1725	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *2/9/2011*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1 and 5-12* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1 and 5-12* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. This Office action addresses pending claims 1 and 5-12. Claims 1 and 11-12 were amended in the amendment filed 2/9/2011.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 1 and 11-12 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

4. Claims 1 and 11-12 recite the new limitation "is free from a monomer capable of being radical-polymerized," which does not appear to have support in the specification.

Claim Rejections - 35 USC § 103

5. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

6. Claims 1 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshinori et al. (JP 2004-047317, see machine translation for citations) and further in view of Negoro (US 6,232,021).

Regarding **claim** 1, Yoshinori discloses a lithium secondary battery **([0006])** comprising:

- A positive electrode including a positive electrode active material **([0031])**
- A negative electrode including a negative electrode active material **([0032]-[0033])**
- And a non-aqueous electrolyte **([0017])**

Yoshinori additionally discloses said negative active material comprises at least one selected from the group consisting of **silicon**, **tin**, a **silicon-containing alloy**, and a **tin-containing alloy ([0033])**.

Yoshinori additionally discloses said non-aqueous electrolyte:

- including an organic peroxide free from a monomer capable of being radical-polymerized **([0017])**
- said organic peroxide accounts for 0.1 to 5 wt% of said non-aqueous electrolyte **([0015])**, and
- said organic peroxide is at least one selected form the group consisting of **hydroperoxides**, **peroxyketals**, and **ketone peroxides ([0019])**

The reference does not explicitly disclose said positive electrode active material comprising at least one lithium-containing composite oxide represented by the following

general formula: $Li_xM^1_{1-y}M^2_yO_2$, where M^1 and M^2 are different elements, M^1 is Ni or Co, M^2 is at least one selected from **Ni, Co, Mn, Mg,** and Al, $1 \leq x \leq 1.05$, and $0 \leq y \leq 0.7$.

Negoro discloses a lithium secondary battery **(C1/L62-C2/L2)** comprising a positive electrode active material comprising at least one lithium-containing composite oxide represented by the following general formula: $Li_xM^1_{1-y}M^2_yO_2$ **(C62/L49-C63/L15)** where M^1 and M^2 are different elements, M^1 is **Ni** or **Co**, M^2 is at least one selected from **Ni**, **Co**, **Mn**, Mg, and Al, $1 \leq x \leq 1.05$, and $0 \leq y \leq 0.7$ **(C63/L4-10)**. Negoro additionally the use of $LiCoO_2$ or $LiNiO_2$ (wherein M^1 = Co or Ni, x = 1, and y = 0) in the positive electrode material. Negoro discloses that $Li_xMn_2O_4$ can also be used **(C63/L7)**.

Therefore, because Negoro teaches that positive active materials such as $LiCoO_2$ or $LiNiO_2$, among others, in place of $Li_xMn_2O_4$, it would have been obvious to one having ordinary skill in the art at the time of invention to replace the $LiMn_2O_4$ of Yoshinori with the active materials of Negoro, such as $LiCoO_2$ or $LiNiO_2$, because Negoro establishes that the materials are equivalent. Further, it would amount to nothing more than a use of a known active material for its intended use in a known environment to accomplish an entirely expected result.

Regarding **claim 6**, modified Yoshinori discloses all of the claim limitations as set forth above. Yoshinori further discloses the secondary battery wherein said negative electrode active material comprises a silicon-containing alloy **([0033])**.

7. Claims 5 and 7-12 rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshinori et al. (JP 2004-047317, see machine translation for citations) and further in view of Negoro (US 6,232,021), and further in view of Kezuka et al. (US 2002/0031710).

Regarding **claim 5**, modified Yoshinori discloses all of the claim limitations as set forth above. While Yoshinori does not explicitly disclose the secondary battery wherein said organic peroxide is further included in said negative electrode, Yoshinori discloses that the addition of the organic peroxide forms a good film on the anode active material that controls the deposit of materials from the cathode material **([0017])** wherein the anode material in Yoshinori is the negative electrode comprising the Si or Sn composite **([0033])**. As Yoshinori discloses that the addition of the film is desirable, it would have been obvious to one of ordinary skill in the art to add the organic peroxide to the anode/negative electrode to form the film on the anode active material.

Furthermore, it is known within the art that solvent comprising the organic peroxide can be impregnated within the positive or negative electrode mixture layers **(see Kezuka et al., US 2002/0031710, [0046])**, and therefore it would have been obvious to one of ordinary skill within the art to use the organic peroxide of Yoshinori in the negative electrode active material as doing so would amount to nothing more than a use of a known organic peroxide in a for its intended use in a known environment to accomplish an entirely expected result.

Regarding **claims 7-8**, modified Yoshinori discloses all of the claim limitations as set forth above, but the reference does not explicitly disclose the secondary battery wherein said silicon-containing alloy comprises; a solid solution including a silicon and

at least one transition metal element including selected from the group consisting of Ti, Ni, Co, Fe, and Cu; or an alloy including silicon and at least one intermetallic compound selected from the group consisting of $TiSi_2$, TiSi, $CoSi_2$, CoSi, $FeSi_2$, FeSi, $NiSi_2$, NiSi, and Cu_3Si.

Kezuka discloses a lithium secondary battery **([0004])** comprising a positive **(21)** and negative **(22)** electrode wherein a non-aqueous electrolyte comprises an organic peroxide **([0047])** and discloses that the negative electrode can comprise a silicon or tin alloy **([0027])**; specific examples of the alloys include $TiSi_2$, $CoSi_2$, $NiSi_2$, and $FeSi_2$ among others **([0027])**.

Therefore, as Kezuka discloses that alloys in the negative electrode can comprise $TiSi_2$, $CoSi_2$, $NiSi_2$, or $FeSi_2$ when an organic peroxide is used in the electrolyte, it would have been obvious to one having ordinary skill in the art to search out for known silicon and tin alloys used within the art to create a negative electrode as doing so would amount to nothing more than a use of a known active material for its intended use in a known environment to accomplish and entirely expected result.

Regarding **claims 9-10**, modified Yoshinori discloses all of the claim limitations as set forth above. Yoshinori does not explicitly disclose the secondary battery wherein said organic peroxide is further included in said positive electrode. However as noted above, Yoshinori discloses that the addition of the organic peroxide forms a good film on the anode active material that controls the deposit of materials from the cathode material **([0017])** wherein the anode material in Yoshinori is the negative electrode comprising the Si or Sn composite **([0033])**. As Yoshinori discloses that the addition of

the film is desirable, it would have been obvious to one of ordinary skill in the art to add the organic peroxide to the anode/negative electrode to form the film on the anode active material.

Furthermore, it is known within the art that solvent comprising the organic peroxide can be impregnated within the positive or negative electrode mixture layers **(see Kezuka et al., US 2002/0031710, [0046])**, and therefore it would have been obvious to one of ordinary skill in the art at the time of invention to include the organic peroxide in the active material layers of the positive or negative electrode as it is known that the organic peroxide can form a protective film layer **(Yoshinori, [0017])** as well as it would amount to nothing more than a use of a known compound for its intended use in a known environment to accomplish an entirely expected result **(see Kezuka)**.

Regarding **claims 11-12**, Yoshinori discloses a lithium secondary battery **([0006])** comprising:

- A positive electrode including a positive electrode active material **([0031])**
- A negative electrode including a negative electrode active material **([0032]-[0033])**
- And a non-aqueous electrolyte **([0017])**

Yoshinori additionally discloses said negative active material comprises at least one selected from the group consisting of **silicon**, **tin**, a **silicon-containing alloy**, and a **tin-containing alloy ([0033])**.

Yoshinori additionally discloses said non-aqueous electrolyte:

- including an organic peroxide free from a monomer capable of being radical-polymerized **([0017])**

The reference does not explicitly disclose said positive electrode active material comprising at least one lithium-containing composite oxide represented by the following general formula: $Li_xM^1_{1-y}M^2_yO_2$, where M^1 and M^2 are different elements, M^1 is Ni or Co, M^2 is at least one selected from Ni, Co, Mn, Mg, and Al, $1 \leq x \leq 1.05$, and $0 \leq y \leq 0.7$.

Negoro discloses a lithium secondary battery **(C1/L62-C2/L2)** comprising a positive electrode active material comprising at least one lithium-containing composite oxide represented by the following general formula: $Li_xM^1_{1-y}M^2_yO_2$ **(C62/L49-C63/L15)** where M^1 and M^2 are different elements, M^1 is **Ni** or **Co**, M^2 is at least one selected from **Ni**, **Co**, **Mn**, Mg, and Al, $1 \leq x \leq 1.05$, and $0 \leq y \leq 0.7$ **(C63/L4-10)**. Negoro additionally the use of $LiCoO_2$ or $LiNiO_2$ (wherein M^1 = Co or Ni, x = 1, and y = 0) in the positive electrode material. Negoro discloses that $Li_xMn_2O_4$ can also be used **(C63/L7)**.

Therefore, because Negoro teaches that positive active materials such as $LiCoO_2$ or $LiNiO_2$, among others, in place of $Li_xMn_2O_4$, it would have been obvious to one having ordinary skill in the art at the time of invention to replace the $LiMn_2O_4$ of Yoshinori with the active materials of Negoro, such as $LiCoO_2$ or $LiNiO_2$, because Negoro establishes that the materials are equivalent. Further, it would amount to nothing more than a use of a known active material for its intended use in a known environment to accomplish an entirely expected result.

While Yoshinori discloses a non-aqueous electrolyte comprising an organic peroxide wherein said organic peroxide is at least one selected form the group

consisting of **hydroperoxides**, **peroxyketals**, and **ketone peroxides ([0019])**, the reference does not explicitly disclose said organic peroxide contained in either the negative electrode or the positive electrode required in claims 11 and 12 respectively.

However as noted above, Yoshinori discloses that the addition of the organic peroxide forms a good film on the anode active material that controls the deposit of materials from the cathode material **([0017])** wherein the anode material in Yoshinori is the negative electrode comprising the Si or Sn composite **([0033])**. As Yoshinori discloses that the addition of the film is desirable, it would have been obvious to one of ordinary skill in the art to add the organic peroxide to the anode/negative electrode to form the film on the anode active material.

Furthermore, it is known within the art that solvent comprising the organic peroxide can be impregnated within the positive or negative electrode mixture layers **(see Kezuka et al., US 2002/0031710, [0046])**, and therefore it would have been obvious to one of ordinary skill in the art at the time of invention to include the organic peroxide in the active material layers of the positive or negative electrode as it is known that the organic peroxide can form a protective film layer **(Yoshinori, [0017])** as well as it would amount to nothing more than a use of a known compound for its intended use in a known environment to accomplish an entirely expected result **(see Kezuka)**.

Response to Arguments

8. Applicant's arguments filed 2/9/2011 have been fully considered but they are not persuasive.

Applicant argues that it would not have been obvious to combine Yoshinori with Negoro because there is no motivation or suggestion to do so and such a combination would impair the purpose of Yoshinori.

This is not considered persuasive. While Yoshinori teaches that the manganese oxide is preferred **([0031])**, Yoshinori also teaches that other elements can also be provided in said manganese oxide **([0031])**. Furthermore, Yoshinori teaches that the compound oxide which replace some manganese of the composite "by other elements is carried out from a viewpoint of resources and cost" **([0003])**. That is, Yoshinori teaches that it is preferable to have a lithium manganese composite oxide with additional element from the viewpoint of resources and cost.

Negoro discloses a lithium secondary battery **(C1/L62-C2/L2)** comprising a positive electrode active material comprising at least one lithium-containing composite oxide represented by the following general formula: $Li_xM^1_{1-y}M^2_yO_2$ **(C62/L49-C63/L15)** where M^1 and M^2 are different elements, M^1 is **Ni** or **Co**, M^2 is at least one selected from **Ni**, **Co**, **Mn**, Mg, and Al, $1 \leq x \leq 1.05$, and $0 \leq y \leq 0.7$ **(C63/L4-10)**. Negoro additionally the use of $LiCoO_2$ or $LiNiO_2$ (wherein M^1 = Co or Ni, x = 1, and y = 0) in the positive electrode material. Negoro discloses that $Li_xMn_2O_4$ can also be used **(C63/L7)**.

Furthermore, Negoro teaches that a lithium manganese composite oxide can comprise additional elements such as Co or Ni **(C63/L8-9)**.

Therefore, because Negoro teaches that positive active materials such as lithium manganese composite oxide including Co or Ni, among others, in place of $Li_xMn_2O_4$, it would have been obvious to one having ordinary skill in the art at the time of invention

to replace the $LiMn_2O_4$ of Yoshinori with the active materials of Negoro, such as the lithium manganese composite oxide, because Negoro establishes that the materials are equivalent. Further, it would amount to nothing more than a use of a known active material for its intended use in a known environment to accomplish an entirely expected result.

Conclusion

9. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jacob Buchanan whose telephone number is (571)270-1186. The examiner can normally be reached on Monday - Friday 7:30-4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Basia Ridley can be reached on (571)272-1453. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/J. B./
Examiner, Art Unit 1725

/Basia Ridley/
Supervisory Patent Examiner, Art Unit 1725